Space Weather Forecast

Issued on Tuesday, 12 December 2023 at 01:09 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of further isolated Moderate flares, mainly Day 1 (12 Dec).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low with the peak flare a modest Common-class flare at 11/1532 UTC from a region located at the southwest limb, which remains the most active region at present. In total there are currently six sunspot regions on the disc. The largest region on the disc is now transiting the northwest quadrant. This region continues to evolve slowly but has shown decay in its intermediate and trailing spots in recent imagery. A smaller bipolar region to the south of this has shown further minor spot emergence/development. All other regions are currently relatively small and simple and are either stable or showing slight signs of decay.

No Earth-directed Coronal Mass Ejections (CMEs) were observed in available imagery. However, some disturbance was observed around 11/2200 UTC in the vicinity of AR3514 associated with a low level Common-class flare. Imagery will be monitored for any potential CME that may have been produced.

Solar Wind / Geomagnetic Activity: Solar winds as observed by ACE and DSCOVR at L1 were at slow-ambient levels. The Total Interplanetary Magnetic Field was weak, while the important north-south component varied weakly. Geomagnetic activity was Quiet (Kp 0-1).

Energetic Particles / Solar Radiation: The count rate of energetic particles remained at background levels with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Generally Low solar activity is expected to continue, with a chance or slight chance of isolated M-flares. These are most likely to emanate from regions in the northwest quadrant and a region initially at the southwest limb.

Solar Wind / Geomagnetic Activity: There are no Earth-directed Coronal Mass Ejections (CMEs) currently expected in the forecast period.

Solar winds are most likely to continue at background levels through Day 1 (12 Dec) and most, if not all, of Day 2 (13 Dec) ahead of the next coronal hole. This is a new feature for this rotation, and is expected to become geoeffective sometime on Day 3 (14 Dec). However, confidence is low in timing and peak wind speeds due to the non-persistent nature of this feature, but slightly elevated winds are expected, possibly reaching elevated levels.

The current Quiet (Kp 0-2) geomagnetic activity is likely to continue until the onset of the faster stream of solar wind from the next coronal hole, which is anticipated to be on Day 3 (14 Dec). There is a slight chance that the onset of the faster winds may produce an isolated G1/Minor

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Geomagnetic Storm interval (Kp 5), but this is considered a low probability at this stage, with Unsettled to Active conditions more likely.

Energetic Particles / Solar Radiation: The count rate of energetic particles is forecast to remain at background levels with only a very slight chance of rising towards the S1/Minor Radiation Storm threshold should any significant flares occur from the two regions in the northwest quadrant, or the departing region at the southwest limb. This risk decreases as the region at the southwest limb rotates further beyond the limb from Day 2 (13 Dec).

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	5	10	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	35	20	20	20
Very Active	R3 to R5 X	No	5	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	5	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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